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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/718,751	11/21/2003	Ayumu Ikemoto	062829	1834

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EXAMINER	
BRUENJES, CHRISTOPHER P	
ART UNIT	PAPER NUMBER
1772	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/718,751	IKEMOTO, AYUMU	
	Examiner	Art Unit	
	Christopher P. Bruenjes	1772	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 August 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3 and 5-8* is/are pending in the application.

4a) Of the above claim(s) *8* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3 and 5-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 12, 2007 has been entered.

WITHDRAWN REJECTIONS

2. The 35 U.S.C. 103 rejections of claims 1 and 3 over Doane in view of Rademacher of record in the Office Action mailed April 13, 2007, Pages 5-7 Paragraph 10, have been withdrawn due to Applicant's amendments in the Paper filed August 6, 2007.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doane et al in view of Rademacher et al and Ikeda et al (US 2002/0074050 A1).

Doane et al anticipate a flexible hose comprising a metal bellows tube (reference number 3, Figure 1 and col.3, l.27-28) having a first rubber layer (reference number 7, Figure 1 and col.3, l.28-36) on the outer circumference thereof. A reinforcing layer is formed on the exterior surface of the first rubber layer (reference number 4, Figure 1 and col.3, l.50-55). An exterior layer is formed on the outer circumference of the reinforcing layer (reference number 5, Figure 1 and col.3, l.57-

63). The metal bellows tube has a corrugated structure with a plurality of spaced apart rings having peaks and a plurality of channels disposed between the rings forming valleys below the peaks (Figure 1). The width of the rings vary in a radial direction so that the width between peaks is narrower than the width of each valley below the peaks (Figures 1 and 2). It would be obvious to one having ordinary skill in the art that the exact width of each channel between peaks would be determined based on the intended end result and size of the hose. The first rubber layer is of a rubber composition that is flowable at low temperature such that each channel is filled with rubber extending throughout each valley (Figure 1).

Although Doane et al teach the rubber is a rubber cement, Doane et al fail to teach the specific rubber used in forming the rubber cement. However, Rademacher et al teach that it is preferred to form rubber cement from EPDM (p.2, paragraph 19) and that the EPDM is combined with acrylic rubber depending on the desired end properties for the rubber (p.2, paragraph 21). Because the rubber cement is formed to flow into the channels formed by the metal bellows and is formed of EPDM combined with acrylic rubber as claimed, the Mooney viscosity is obviously between 15 and 45 at 100°C because the rubbers having substantially the same composition should possess the same

properties. Therefore, it would have been obvious to one having ordinary skill in the art at the time Applicant's invention was made to select EPDM combined with acrylic rubber as the rubber used in forming rubber cement because EPDM is a preferred rubber for that purpose as taught by Rademacher et al.

Thus, it would have been obvious to one having ordinary skill in the art at the time Applicant's invention was made to select the EPDM combined with acrylic rubber of Rademacher et al as the rubber for forming the rubber cement of Doane et al, since Doane et al only teaches rubber cement generally and Rademacher et al teaches that EPDM is a preferred rubber for forming rubber cement.

Doane et al and Rademacher et al taken as a whole fail to teach that the intermediate rubber layer further comprises a resorcinol group. However, Ikeda et al teach a hose formed of metal bellows (p.6, paragraph 80) with a rubber layer bonded to the metal layer (p.5, paragraph 79). Ikeda et al further teach that a resorcinol group is added to a rubber bonded to an inner metal tube because the resorcinol group acts as an adhesive to the metal and improves adhesion between the metal and rubber (p.1, paragraph 14). Therefore, it would have been obvious to one having ordinary skill in the art that a resorcinol group is added to a rubber layer that is bonded to a metal tube in order

to improve the adhesion between the rubber and metal tube, as taught by Ikeda et al.

Thus, it would have been obvious to one having ordinary skill in the art at the time Applicant's invention was made that a resorcinol group would be added to the first rubber layer of Doane et al in order to improve the adhesion between the first rubber layer and the metal, as taught by Ikeda et al, since it is the desire of Doane et al to have a strong bond between the rubber and metal bellows.

6. Claims 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doane et al in view of Rademacher et al and Ikeda et al as applied to claim 1 above, and further in view of Kubota et al (WO 2001/57132 A1). Note US 6,689,843 is the English equivalent of WO 2001/57132 A1 and the column and line citing will be from the US patent.

Doane et al, Rademacher et al, and Ikeda et al taken as a whole teach all that is claimed in claim 1 as presented above, but fail to teach that the first rubber layer comprising the acryl group is an acryl group of the formula claimed. The rubber composition claimed in claim 5 is an ethylene acrylic ester copolymer or ethylene acrylic rubber having a carboxyl group. Rademacher et al teach that the rubber composition of

the first rubber layer is formed of acrylic rubber, but does not explicitly teach that the acrylic rubber is an ethylene acrylic rubber further containing a carboxyl group or the percentage of ethylene, acrylic ester, and carboxyl groups present in the composition. However, Kubota et al teach that acrylic rubbers are widely used in the automobile field such as the hose of Doane et al because of its good heat resistance (col.1, l.22-23). Kubota et al further teach that there is a demand for producing an acrylic rubber having more enhanced heat resistance (col.1, l.24-26) and that adding a carboxyl group to the acrylic rubber increases the heat resistance (col.1, l.65-67). Kubota et al teach that the acrylic rubber is formed of ethylene and acrylic acid ester monomers (col.3, l.34-50). Kubota et al also teach that the acrylic acid ester monomer combined with the carboxyl group is contained in the mixture in an amount of 70% or greater (col.3, l.50-55), which correlates to the combined value of y and z in claims 5 and 7. Kubota et al also teach that of the combination of acrylic acid ester and carboxyl group, the acrylic acid ester forms 90% or greater of the mixture. Therefore, Kubota et al teach values for x representing the ethylene monomer, y representing the acrylic ester portion, and z representing the carboxyl group that fall within the ranges claimed in claims 5 and 7. Kubota et al teach

that these values are determined because if the concentration of the ethylene monomer is too large the rubber becomes poor in rubber characteristics (col.3, l.54-60) and if the concentration of the carboxylic group is too small the rubber is poor in crosslinkability and if it is too large the rubber has poor tensile strength and elongation (col.4, l.1-9). One of ordinary skill in the art would have recognized that a carboxyl group is added to an ethylene acrylic acid ester co-polymer rubber in order to provide the rubber with enhanced crosslinkability and ultimately heat resistance, as taught by Kubota et al.

Thus, it would have been obvious to one having ordinary skill in the art at the time Applicant's invention was made to add a carboxyl group to the acrylic rubber of Doane et al and Rademacher et al in order to provide the rubber with enhanced heat resistance, which is an increasing demand in the automobile field, as taught by Kubota et al. Furthermore, it would have been obvious to one having ordinary skill in the art at the time Applicant's invention was made to set the relative amounts of the ethylene monomer, acrylic acid ester monomer, and carboxyl group would fall within the claimed range in order to form a rubber composition that has the desired amount of rubber characteristics crosslinkability and tensile strength and elongation, as taught by Kubota et al.

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Doane et al in view of Rademacher et al and Ikeda et al as applied to claim 1 above, and further in view of Ozawa et al (USPN 6,492,454) and Watanabe et al (USPN 6,166,143).

Enomoto et al, Poxon et al, and Ikeda et al taken as a whole teach all that is claimed in claim 1 as presented above, but fail to teach that the first rubber layer comprising the acryl group is an acryl group of the formula claimed. The rubber composition claimed in claim 6 is an ethylene acrylic ester copolymer or ethylene acrylic rubber having an epoxy group. Rademacher et al teach that the rubber composition of the first rubber layer is formed of acrylic rubber, but does not explicitly teach that the acrylic rubber is and ethylene acrylic rubber further containing an epoxy group or the percentage of ethylene, acrylic ester, and epoxy groups present in the composition. However, Ozawa et al teach that in production of hoses comprising metal and rubber layers ethylene acrylic rubber or ethylene acrylic acid ester copolymer rubber is known to have excellent heat resistance but does not bond well to metal (col.2, l.40-53). Ozawa et al further teach that if ethylene acrylic acid ester is formed with an epoxy group such as

ethylene-acrylic acid ester-glycidyl methacrylate copolymer rubber, the rubber does not require an additional polymer having epoxy groups to provide adhesiveness with a metal layer, because the epoxy group contained within the acrylic polymer provides the adhesiveness (col.11, l.37-50). Therefore, it would have been obvious to one having ordinary skill in the art at the time Applicant's invention was made to select an ethylene acrylic rubber containing epoxy groups such as the ethylene-acrylic acid ester-glycidyl methacrylate copolymer rubber taught by Ozawa et al in order to provide the ethylene acrylic rubber with the ability to be adhere to the metal, as taught by Ozawa et al.

Thus, it would have been obvious to one having ordinary skill in the art at the time Applicant's invention was made to form the first rubber layer formed of acrylic rubber of Doane et al and Rademacher et al with an epoxy group, in order to provide the ethylene acrylic rubber with adhesiveness to the metal layer in the hose of Doane et al, as taught by Ozawa et al.

Ozawa et al fail to teach the individual percentages of the ethylene monomer, acrylic acid ester monomer, and epoxy group present in the first rubber layer. However, Ozawa et al does teach that the ethylene acrylic acid ester copolymer rubber has any compositional proportion within the range generally used so long as the ethylene content therein is within the range that

does not impair rubber elasticity and satisfy the characteristic of heat resistance (col.9, l.64 - col.10, l.4). Watanabe et al teach that the compositional proportions of the ethylene and acrylic ester is between 50:50 and 85:15 in order to maintain rubber elasticity (col.4, l.40-50). Watanabe et al also teach that the epoxy group is found in the copolymer rubber in an amount between 0.05 and 5mol%. Therefore, Watanabe et al teach values for x representing the ethylene monomer, y representing the acrylic ester portion, and z representing the epoxy group that fall within the ranges claimed. Therefore, it would have been obvious to one having ordinary skill in the art at the time Applicant's invention was made that the compositional proportions taught by Watanabe et al are within the range generally used because the proportions are used in order to maintain rubber elasticity of the rubber, as taught by Watanabe et al.

Thus, it would have been obvious to one having ordinary skill in the art at the time Applicant's invention was made to select the compositional proportions of the ethylene monomer, acrylic acid ester monomer and epoxy group of the first rubber layer of Doane et al, Rademacher et al, and Ozawa et al within the claimed ranges, since Ozawa et al teach that the compositional proportions fall within the range generally used

in order to preserve the rubber elasticity of the composition and Watanabe et al teach specific values within the claimed ranges as the proportions required to ensure that the composition maintains its rubber elasticity.

Response to Arguments

8. Applicant's arguments filed August 6, 2007 have been fully considered but they are not persuasive.

In response to Applicant's argument that the specific combination of a rubber of an acryl group and a compound of a resorcinol group is unobvious over a combination of EPDM and a compound of a resorcinol group, the closest prior art cited includes EPDM and acryl group containing rubbers. Furthermore, both applicant's examples 1 and 2 meet applicant's required properties and it would have been expected that different rubbers would create differing adhesion strengths. A 10% difference in adhesion strength when both amounts are taught in Applicant's specification to be sufficient is not sufficient to prove unexpected results, and only bolsters the position that differences are within an expected range of difference.

In response to Applicant's argument that the references do not specifically teach the Mooney viscosity of a rubber cement formed of an acryl group and resorcinol group, the Mooney

viscosity would obviously fall within the claimed range when it is formed of the same materials especially when used for the same purpose because viscosity of a rubber is based on the composition of the rubber. Therefore, if the same or substantially the same rubber composition is used by applicant and the prior art the rubber must possess substantially the same properties.

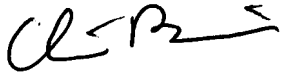
In response to Applicant's argument that a rubber composition including a resorcinol compound and EPDM as disclosed by the prior art cannot achieve the adhesive strength associated with the present invention. First, the disclosed prior art teaches EPDM and acryl group combined rubber containing a resorcinol compound. Second, Applicant's specification teaches that EPDM combined with a resorcinol compound does achieve the desired adhesive strength.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher P. Bruenjes whose telephone number is 571-272-1489. The examiner can normally be reached on Monday thru Friday from 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rena Dye can be reached on 571-272-3186. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Christopher P Bruenjes
Examiner
Art Unit 1772

CPB
August 16, 2007